a first control signal to the programmable current source at a first time such that the associated level of the bias current at the first time corresponds to the first current level;

a second control signal to the programmable current source at a second time such that the associated level of the bias current at the second time corresponds to the second current level;

a third control signal to the programmable current source at a third time such that the associated level of the bias current at the third time corresponds to the second current level; and

a fourth control signal to the programmable current source at a fourth time such that the associated level of the bias current at the fourth time corresponds to the first current level;

a converter that includes an input that is coupled to the remote sensor circuit, and an output that is configured to provide voltage values that correspond to a voltage across the PN junction at the first, second, third, and fourth times; and

a processor that is coupled to the output of the converter, wherein the processor calculates a temperature value in response to the voltage values that are produced at the first, second, third, and fourth times.

2.   (Amended)   The system of claim 1, the processor comprising:

a first average calculator that is arranged to provide a first temperature average in response to the voltage values from the first and fourth times;

a second average calculator that is arranged to provide a second temperature average in response to the voltage values from the second and third times; and

a temperature calculator that is arranged to calculate the temperature value in response to the first and second temperature averages.

3.   (Amended)   The temperature sampling system of claim 2, the first average calculator further comprising:

an adder that is arranged to provide a sum of the voltage values from the first and fourth times; and

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a divider that is arranged to provide the temperature value by dividing the sum of the voltage values by a factor equal to the number of the voltage values from the first and fourth times.

4.   (Amended) The temperature sampling system of claim 1, the processor further comprising:

a first subtracter that is arranged to provide a first difference in response to the voltage values from the first and second times;

a first temperature calculator that is arranged to provide a first initial temperature in response to the first difference;

a second subtracter that is arranged to provide a second difference in response to the voltage values from the third and fourth times;

a second temperature calculator that is arranged to receive the second difference as an input and provides a second initial temperature as an output in response to the second difference; and

an average calculator that is arranged to calculate the temperature value in response to the first and second initial temperatures.

17.   The method of claim 14, wherein the method for applying the sequence of the first and second current levels further comprises applying a third current level to a remote sensor circuit and wherein the step of determining the temperature value further comprises determining the temperature value from the third current level.

19.   A system of determining a temperature from a remote sensor, comprising:

means for producing a first current level;

means for producing a second current level that is different from the first current level;

means for applying a sequence of the first and second current levels to the remote sensor circuit, wherein the sequence is selected from a random sequence, a pseudorandom sequence, and an ordered sequence, wherein the ordered sequence comprises a first selected current level that is applied at a first and a last time and a second selected current level that is applied at a second and a next-to-last time;

means for measuring first voltages from the remote sensor circuit when the first current level is applied;

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means for measuring second voltages from the remote sensor circuit when the second current level is applied;

means for determining a temperature value from the first and second measured voltages.

20.   The system of claim 19, wherein the temperature value is calculated by:

means for determining a first average using the first measured voltages;

means for determining a second average using the second measured voltages; and

means for using the first and second averages to calculate the temperature value.

21.   The system of claim 19, wherein the temperature value is calculated by:

means for determining a first difference between the first and second measured voltages when the first current level applied is followed by the application of the second current level;

means for determining a second difference between the first and second measured voltages that occur upon the change from applying a second current level to applying a first current level; and

means for calculating the temperature value from the first and second differences.

22.   The system of claim 19, wherein the means for applying the sequence of the first and second current levels further comprises means for applying a third current level to a remote sensor circuit and wherein the means for determining the temperature value further comprises means for determining the temperature value from the third current level.

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